

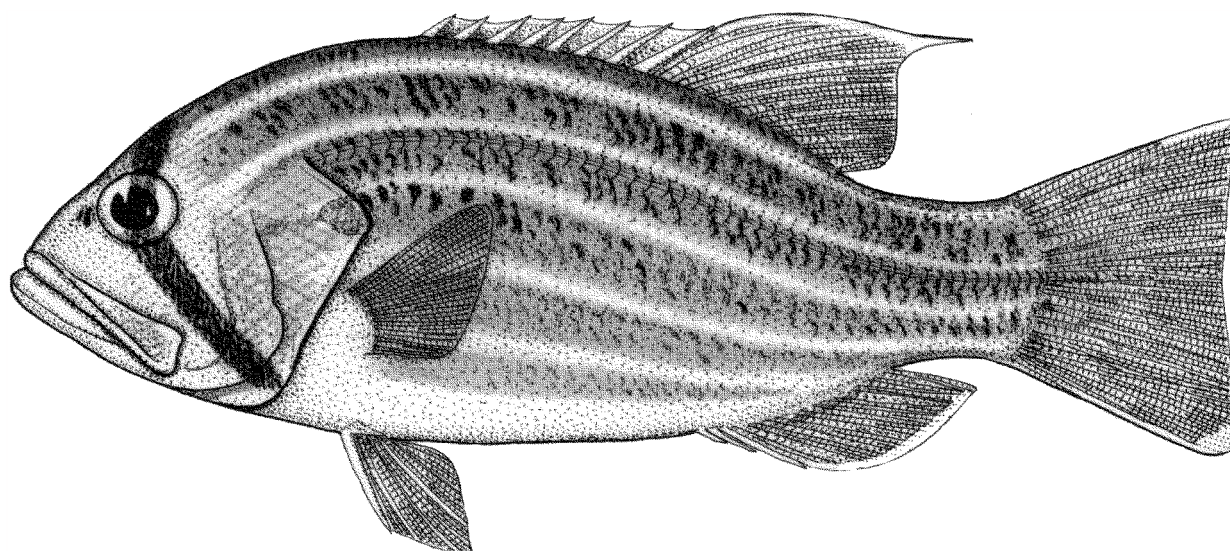


FAO SPECIES CATALOGUE

Volume 17

PEARL PERCHES OF THE WORLD (Family Glaucosomatidae)

An annotated and illustrated catalogue of the pearl perches
known to date



Food
and
Agriculture
Organization
of
the
United
Nations

FAO SPECIES CATALOGUE

VOL. 17. PEARL PERCHES OF THE WORLD

(Family Glaucosomatidae)

An Annotated and Illustrated Catalogue of the Pearl Perches Known to Date

by

Roland J. McKay

Museum of North-Western Queensland
P.O. Box 280, Mount Isa
Australia, 4825

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, 1997

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

M-40
ISBN 92-5-103988-7

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior permission of the copyright owner. Applications for such permission, with a statement of the purpose and extent of the reproduction, should be addressed to the Director, Information Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, 00100 Rome, Italy.

© FAO 1997

PREPARATION OF THIS DOCUMENT

This document was prepared under the FAO Fisheries Department Regular Programme by the Species Identification and Data Programme in the Marine Resources Service of the Fishery Resources Division. It is the seventeenth worldwide species catalogue in the FAO Fisheries Synopsis series.

The author has studied all species within the genus and had a long association with the Western Australian jewfish as Cadet, Assistant Fisheries Inspector and Senior Technical Officer, Western Australian Fisheries Department. His knowledge of the fishing strategies adopted by commercial fishermen on the Western Australian coast was gained by fishing with many jewfishermen, particularly Joe Hubbard, Frank Brown, "Black" Jack Nelly, Bill and Wilf Poole, Peter Donetti and many others now retired.

The illustrations were either drawn by the author or were redrawn at FAO from the author's sketches under the supervision of the editor.

Project manager: Pere Oliver, FAO, Rome.

Technical editor: V.H. Niem, FAO, Rome.

Illustrators: R.J. McKay, Museum of North-Western Queensland, Mount Isa, Australia, and E. D'Antoni, FAO, Rome.

Page composition and indexing: G. Sciarappa-Demuro, FAO, Rome.

McKay, R.J.

FAO species catalogue. Vol. 17. Pearl perches of the world. (Family Glaucosomatidae).
An annotated and illustrated catalogue of the pearl perches known to date.

FAO Fisheries Synopsis. No. 125, Vol. 17. Rome, FAO. 1997. 26 p., 18 figs.

ABSTRACT

This is the seventeenth issue in the FAO series of world-wide annotated and illustrated catalogues of the groups of marine organisms that enter marine fisheries. This volume covers all four species currently recognized in the family Glaucosomatidae (pearl perches). It includes a glossary of technical terms, general remarks on the family, an illustrated key to species, detailed accounts of species, and a table of species by major fishing areas. Species accounts include illustrations, scientific and vernacular names, references to scientific names, information on habitat, biology and fisheries, and a distribution map. The work is fully indexed and a reference to pertinent literature is appended.

Distribution

Author
FAO Fisheries Officers
Regional Fisheries Councils and Commissions
Selector SC

Acknowledgements

I wish to express my sincere gratitude to the legendary Matt Goodlad, Bunbury, Western Australia, retired Fisheries Inspector and commercial jewfisherman extraordinaire who taught me the value of recording facts in a field notebook about the fishes I caught and who first instructed me in the art of jewfishing using the fishing line as a "line of communication". To my superiors, the late Alex Frazer and the active Bernard Bowen, Directors, Western Australian Fisheries Department, my thanks for your encouragement. To Dr J. Paxton, Australian Museum, thanks for specimens sent on loan. Mr Ern Grant, Scarborough, Queensland, for pearl perch generously donated for study. Dr A. Bartholomai for the smallest of his large catch of pearl perches. To my assistant Jeff Johnson for preparation of skeletons and database extracts. Pingping Xu offered encouragement and advice. Dr Peter Jell, my thanks for your continued support of worldwide studies of marine fish families by the Department of Fishes, Queensland Museum. To the Director and Board of the Queensland Museum my gratitude for facilities, support and for providing the opportunity to study fishes in and outside Queensland waters.

My deepest appreciation to Dr Walter Fischer (FAO, Rome, retired) for encouragement. The assistance of FAO staff made this publication possible.

Table of Contents

	<u>Page</u>
1. INTRODUCTION	1
1.1 Glaucosomatids in World Fisheries	1
1.2 Plan of the Systematic Catalogue	1
1.3 Glossary of Technical Terms, Measurements and Counts	2
2. SYSTEMATIC CATALOGUE	4
2.1 The Family Glaucosomatidae	4
2.2 Illustrated Key to Species	7
2.3 Information by Species	9
<i>Glaucosoma</i>	GLAUC Glauc 9
<i>Glaucosoma buergeri</i>	GLAUC Glauc 1 9
<i>Glaucosoma hebraicum</i>	GLAUC Glauc 2 12
<i>Glaucosoma magnificum</i>	GLAUC Glauc 3 16
<i>Glaucosoma scapulare</i>	GLAUC Glauc 4 18
3. LIST OF SPECIES BY MAJOR FISHING AREAS	20
4. BIBLIOGRAPHY	22
5. INDEX OF SCIENTIFIC AND VERNACULAR NAMES	25

1. INTRODUCTION

This catalogue includes major taxonomic references to all species currently recognized in the family Glaucosomatidae. It is based on a revision of the family made by the author on material examined for all species.

1.1 Glaucosomatids in World Fisheries

The fishes of this small family are recognized as possessing flesh of superior quality. They are taken by handline, bottom trawl, gillnet and spear. Not particularly sought except as a commercial and recreational fishery based on the Westralian jewfish and to a lesser extent on the pearl perch of eastern Australia.

1.2 Plan of the Systematic Catalogue

A family description is given, followed by general information on fisheries, biology, habitat and distribution. A key to the four species in the genus is provided. The species accounts are arranged alphabetically. The information pertaining to each species is arranged by paragraphs, in the order listed below:

- (1) **Scientific Name:** The reference for the original description and type locality is given.
- (2) **Synonyms:** All invalid names and combinations that have been applied are referenced.
- (3) **FAO Names:** The FAO English name is considered the standard to be used for fishery purposes. This should avoid confusion which can be caused due to the existence of multiple names for the same

species or the same name for several species. The FAO name is not intended to supplant the use of local names but rather, to serve as a worldwide reference. The French and Spanish names are not yet available.

- (4) **Diagnostic Features:** Distinctive characters of the species are given as an aid for identification, accompanied by useful diagrams. These diagnoses should be consulted to confirm species identified using the illustrated key.
- (5) **Geographical Distribution:** The general geographic range is given in the text and illustrated on a map. The map shading includes known areas of occurrence and intermediate areas between locality records where a species is expected to be found.
- (6) **Habitat and Biology:** Information on habitat, behaviour, feeding and reproduction is included here.
- (7) **Size:** The approximate maximum known total length is given.
- (8) **Interest to Fisheries:** General information on the extent, type of fisheries and utilization.
- (9) **Local Names:** These are given where published names are available.
- (10) **Literature:** Recent references which contain illustrations that could be useful for identification are given.
- (11) **Remarks:** Useful information which is not appropriately covered in the previous sections is included here.

1.3 Glossary of Technical Terms, Measurements and Counts

A typical glaucosomatid is shown in Fig. 1. The proportional measurements found to be useful in the identification of these fishes are shown; these have been given in the species diagnoses as parts of standard length or of head length and are calculated from material examined by the author unless otherwise stated.

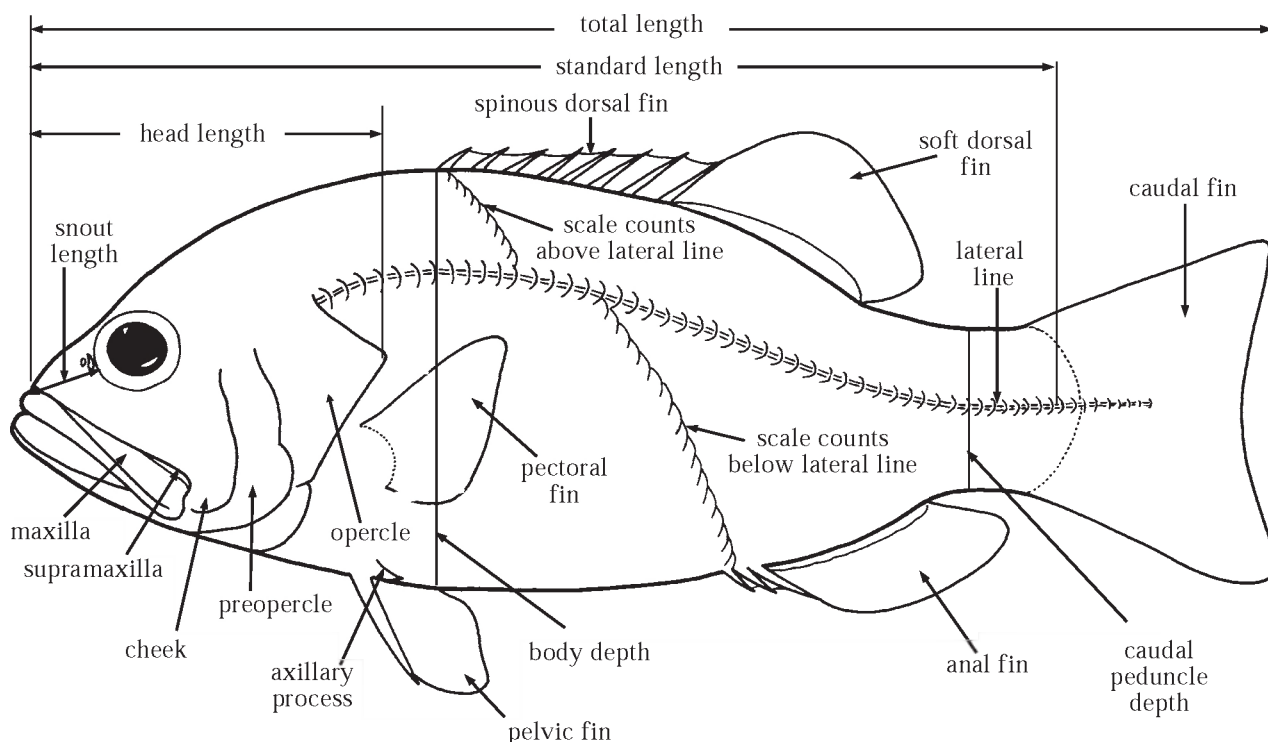


Fig. 1 External morphology and measurements

Anal fin - The unpaired fin located on the ventral part of body (Fig. 1); usually of 3 spines followed by the soft rays, the posterior ray divided to the base counted as one ray.

Anterior - The front portion; the opposite of posterior.

Body depth - Measured as the greatest distance from the dorsal midline to the ventral midline of the body; expressed as parts of standard length (Fig. 1).

Caudal fin - Median fin situated at the posterior end of the body (Fig. 1).

Caudal peduncle - The narrow end of the body between the posterior basal end of the anal-fin base and the base of the caudal fin. The **caudal peduncle-depth** is measured as the least depth of the caudal peduncle; expressed as parts of standard length.

Ctenoid scales - Scales which have tiny tooth-like projections along their posterior margin.

Dorsal fin - The unpaired fin along the back of the fish, consisting of a spinous and a soft portion (Fig. 1). **Soft dorsal rays** are the flexible branched rays of the soft dorsal fin, the posterior ray is usually branched near its base thus appearing as two, but counted as one. This count follows that of the dorsal spines.

Eye diameter - Horizontal diameter between the fleshy margins of the orbit; expressed as parts of head length.

Head length - Distance from the tip of snout to the most distant end of the gill cover, including any fleshy membrane; expressed as parts of standard length (Fig. 1).

Interorbital - The shortest distance between the fleshy margins of the orbit is the Interorbital

width; expressed as parts of head length. The **interorbital space** is the region between the eyes.

Isthmus - The area of the ventral surface where the gill membranes meet.

Lateral line - A series of pored or tubed scales forming a raised line along the side of the body (Fig. 1). The **Lateral-line scales** are the number of pored lateral-line scales from origin of gill cover above to the caudal fin flexure.

Orbit - The bony border surrounding the eye.

Otoliths - "Ear-stones", located in the ear capsules on each side of the head; one pair (sagitta) is always large (Fig. 2), while the other two pairs are rudimentary. The structure of otoliths provides information on age, growth, physiology, ecology, and phylogenetic relationships of fishes.

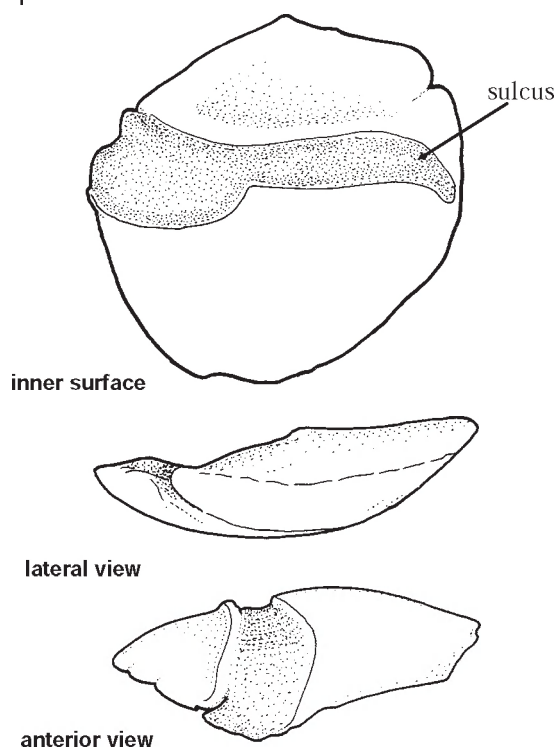


Fig. 2 Right saccular otolith (sagitta) of a glaucosomatid

Pectoral fins - The fins on each side of the body immediately behind the gill opening (Fig. 1). The **Pectoral-fin length** is the length of the longest pectoral-fin ray; expressed as parts of standard length.

Pelvic fins - Paired fins on the ventral edge of the anterior half of the body (Fig. 1).

Posterior - The rear or hind portion; the opposite of anterior.

Preorbital depth - From lower part of orbit to lower edge of preorbital, the largest of the bones forming the lower edge of the orbit; expressed as parts of head length.

Rays - The rigid structures that support the fin; soft rays are segmented, and flexible; spinous rays are stiff and unsegmented.

Scales above and below lateral line - Scales above the lateral line are counted from the origin of the dorsal fin in oblique series backwards and downwards to (but not including) the lateral line row; scales below the lateral line are counted from the origin of the anal fin obliquely forwards and upwards to the lateral line (but not including the lateral row) (Fig. 1).

Snout length - Distance from the tip of snout to the anterior margin of the eye; expressed as parts of head length) (Fig. 1).

Standard length - The straight line distance from the tip of the snout to a vertical line passing through the base of the caudal fin (taken to be the point of flexure of the caudal fin (Fig. 1).

Swimbladder - A gas filled sac in the dorsal part of the body cavity (Fig. 3).

Total length - The straight line distance from the tip of the snout to the posteriormost part of the caudal fin (Fig. 1).

Ventral - Toward the lower part of the body; the opposite of dorsal.

Vomer - A median bone which lies in the roof of the mouth, often bearing teeth.

2. SYSTEMATIC CATALOGUE

2.1 The Family Glaucosomatidae

FAO Names: En - Pearl perches.

Diagnostic Features: Robust to deeply ovate, compressed, marine coastal perch-like fishes. Head large; scales present on entire head except tip of snout, lips and chin (maxillary, mandible and isthmus scaled). Mouth large, oblique, terminal and protractile, lips thin; maxilla broad, scaled, with a narrow supplemental bone (supramaxilla) above, scarcely slipping below preorbital; lower jaw protruding; teeth pointed or conical, in narrow bands in jaws, usually without canines; teeth on vomer, palatines and tongue; preopercle with blunt spines at angle or entire; opercle with one blunt spine. Dorsal fin single with VIII graduated spines and 12 to 14 soft rays which are much higher than the spines; pectoral fins short and blunt; pelvic fins small, below base of pectoral fins, with I spine and 5 soft rays; anal fin with III short graduated spines and 9 to 10 soft rays; caudal fin lunate or emarginate, sometimes with the tips produced or filamentous. Scales ctenoid, small or moderate, a basal sheath present; lateral line continuous, tubes simple. Vertebrae 10 + 15; haemapophyses (lower surface) of the 5th to 10th modified, the 6th to 8th forming flat plates to which the swimbladder is firmly bound (see Tominaga, 1986; also Fig. 4). Swimbladder (Fig. 3) with the anterioventral portion unattached to overlie the lower sclerotic swimbladder tissue forming a free anterior pocket below which is a space with an anteriorly directed slit between the inner surface of the bladder and the ceiling comprised of the lamellar haemapophyses and the dorsal inner surface of the bladder; a cylindrical muscle bundle originates from the bony wing of the pterotic situated posterior to the opening of the sensory canal system, passes between the ventral process of the post-temporal and Baudelot's ligament, enters the slit of the cover of the swimbladder where it meets with its counterpart, and attaches to the dorsal surface of the inner swimbladder surface; a trapezoid red muscle originates from the last modified haemapophysis, extends forward and, as a white muscle, attaches to the dorsal surface of the swimbladder and the cylindrical muscle bundles (Tominaga, 1986); posterior of swimbladder free.

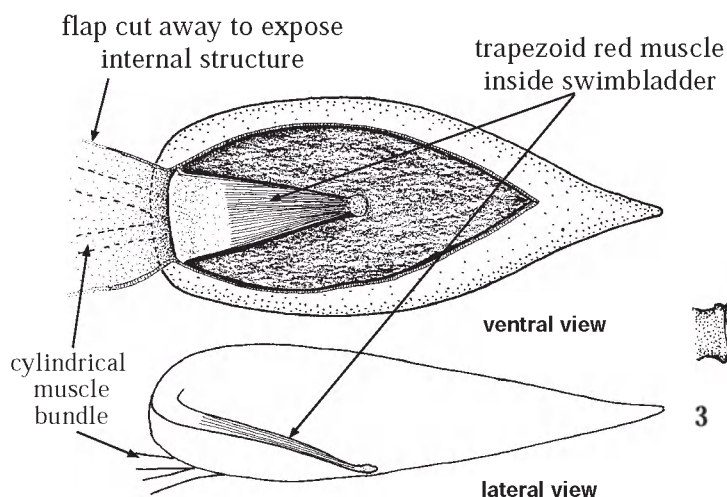


Fig. 3 Swimbladder (*Glaucosoma scapulare*)

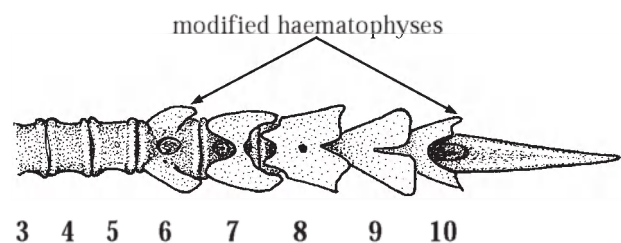


Fig. 4 Abdominal vertebrae
3-10 in ventral view
(*Glaucosoma buergeri*)

Glaucosomatids are somewhat similar in shape to the snappers of the family Lutjanidae, but differ in lacking strong canine teeth on the jaws, and in having a very thin supplementary bone (supramaxilla) on the upper edge of the maxillary bone (Fig. 1). The Glaucosomatidae is related to the Pempheridae in having the same structure of the swimbladder, the modification of the haemapophyses of the 5th to 10th abdominal vertebrae, the foramen in the frontal bone (Katayama, 1954; Tominaga, 1986), features of the otolith in *G. magnificum*, and in lacking an articulation between the second epibranchial and pharyngobranchial (Johnson, 1993). Johnson further recommended that the Glaucosomatidae should be included as a subfamily of the Pempheridae. The family Glaucosomatidae is recognized here based on the possession of fewer anal fin elements (9 to 12 versus 17 to 45), more dorsal spines (8 or 9 versus 4 to 6), a supramaxillary bone, the procurent spur of the caudal fin, the axillary process of the pelvic fin (Fig. 1), and in lacking the two ventral processes attaching the cleithrum (Tominaga, 1986).

Habitat and Biology: Generally frequenting submerged reefs, pinnacles and rough rocky bottom in moderately deep water, but moving into shallow water at times. Usually strictly bottom feeders that may move up into the water column to take a bait on occasions. These fishes feed mostly at dawn or dusk and may be taken throughout the day and night in deep water. The large eye is characteristic of these fishes and fishermen prefer white baits such as skinned octopus or squid when fishing deep or at night. Professional fishermen recognize that these fishes are influenced by the phases of the moon. Their biology is poorly known.

Geographical Distribution: Indo-West Pacific from Japan and China coast to the tropical and warm temperate coasts of Australia.

Interest to Fisheries: All are superior tablefishes with white flesh of excellent texture and superb flavour. Recognized in Australia to be some of the finest of foodfishes available.

Remarks: Regan (1913) commented that *Arripis* resembles *Glaucosoma*, but included *Glaucosoma* within the Centropomidae as did Norman (1966) who placed it within the subfamily Latinae. Modern authors have placed this family adjacent to the Terapontidae and Pseudochromidae (Gloerfelt-Tarp and Kailola, 1984), or the Acanthoclinidae and Terapontidae (Greenwood et al. 1966; Paxton et al., 1989). However, the family is clearly the sister family to the Pempheridae as demonstrated by Katayama (1954) and Tominaga (1986). Further relationships can be evidenced in the cranial morphology and the morphology of the otoliths. The saccular otoliths (sagittae) of the Glaucosomatidae are typical of the Percoidei. There is no fossil record of the family nor of the Pempheridae. The otolith of *Glaucosoma magnificum*, in being almost as deep as long, appears to be the most plesiomorphic and shows a clear relationship to that of *Pempheris* (Fig. 5). A phylogenetic hypothesis of the Glaucosomatidae is shown in Fig. 6.

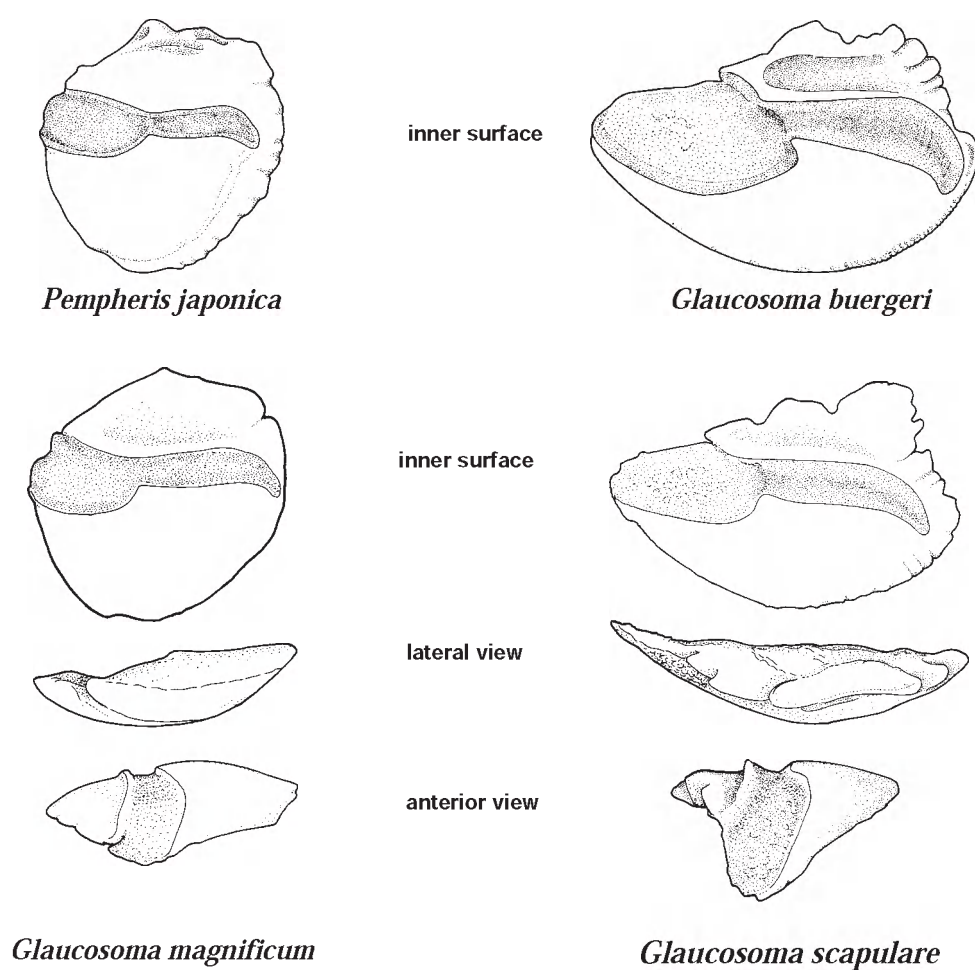


Fig. 5 Saccular otoliths

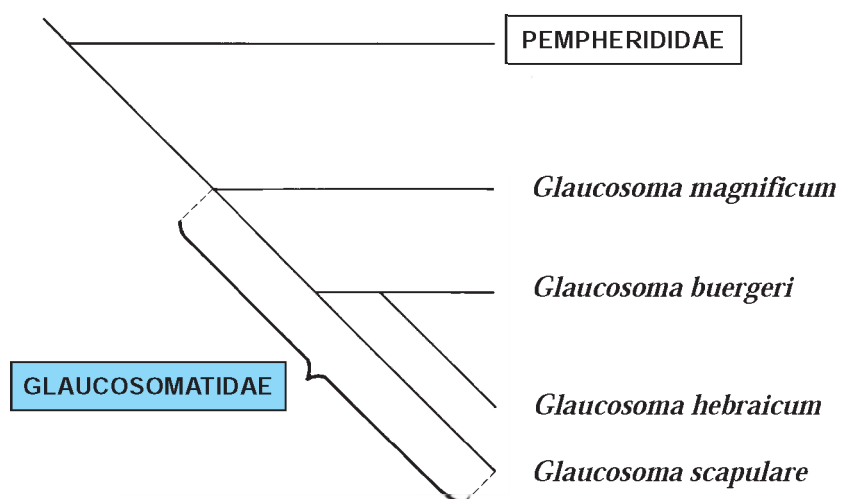


Fig. 6 Phylogenetic hypothesis of the Glaucosomatidae

2.2 Illustrated Key to Species

- 1a.** Three dark vertical bands from nape, the first through eye, the second along the edge of the preopercle and the third down to the base of the pectoral fins; dorsal, caudal and anal fins with some filamentous rays; 14 dorsal-fin rays and 12 anal-fin rays (Fig. 7) *Glaucosoma magnificum*
- 1b.** One dark vertical band through eye which may disappear with an increase in size; 11 dorsal-fin rays and 9 anal-fin rays → 2

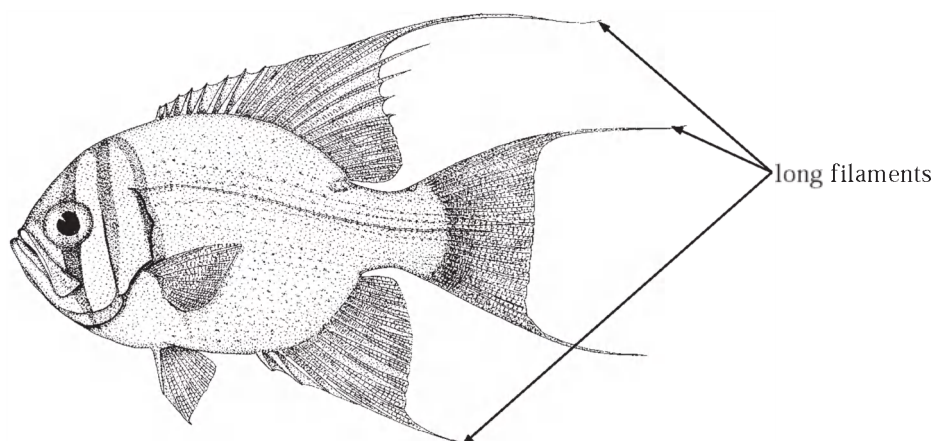


Fig. 7 *Glaucosoma magnificum*

- 2a.** Supraclavicle (shoulder-bone) developed into a prominent bony shield (Fig. 8) *G. scapulare*
- 2b.** Supraclavicle not developed into a bony shield → 3

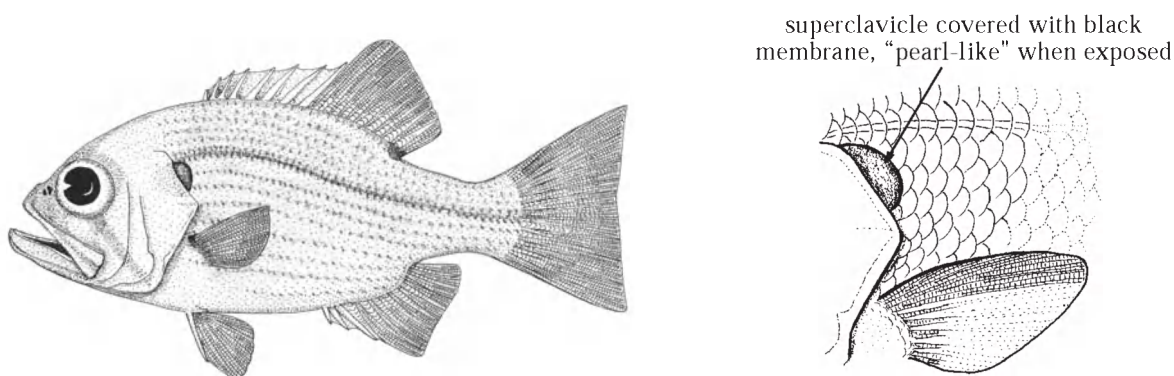


Fig. 8 *Glaucosoma scapulare*

- 3a. Peritoneum and gill rakers black; lateral line with 49 to 51 pored scales; juveniles with narrow horizontal bands narrower than interspaces (Fig. 9) *G. buergeri*
- 3b. Peritoneum and gill rakers pale; lateral line with 44 to 48 pored scales; juveniles with wide dark horizontal bands wider than interspaces (Fig. 10) *G. hebraicum*

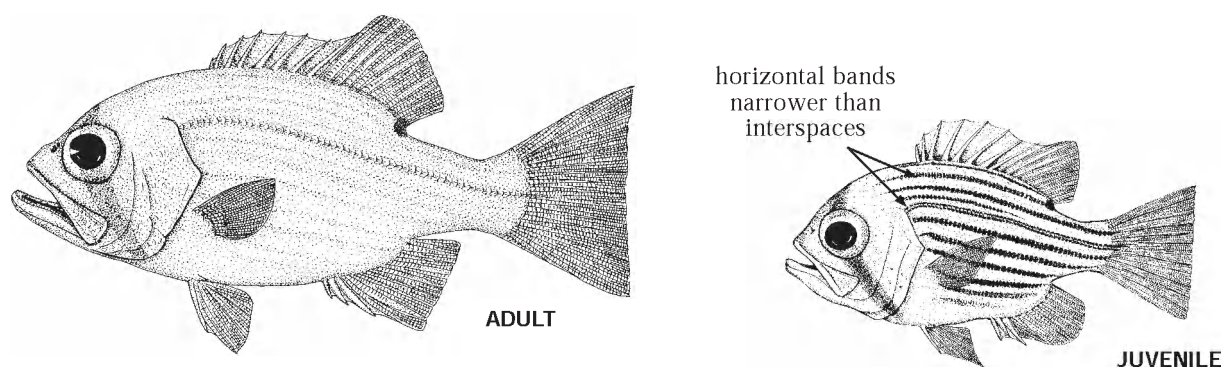


Fig. 9 *Glaucosoma buergeri*

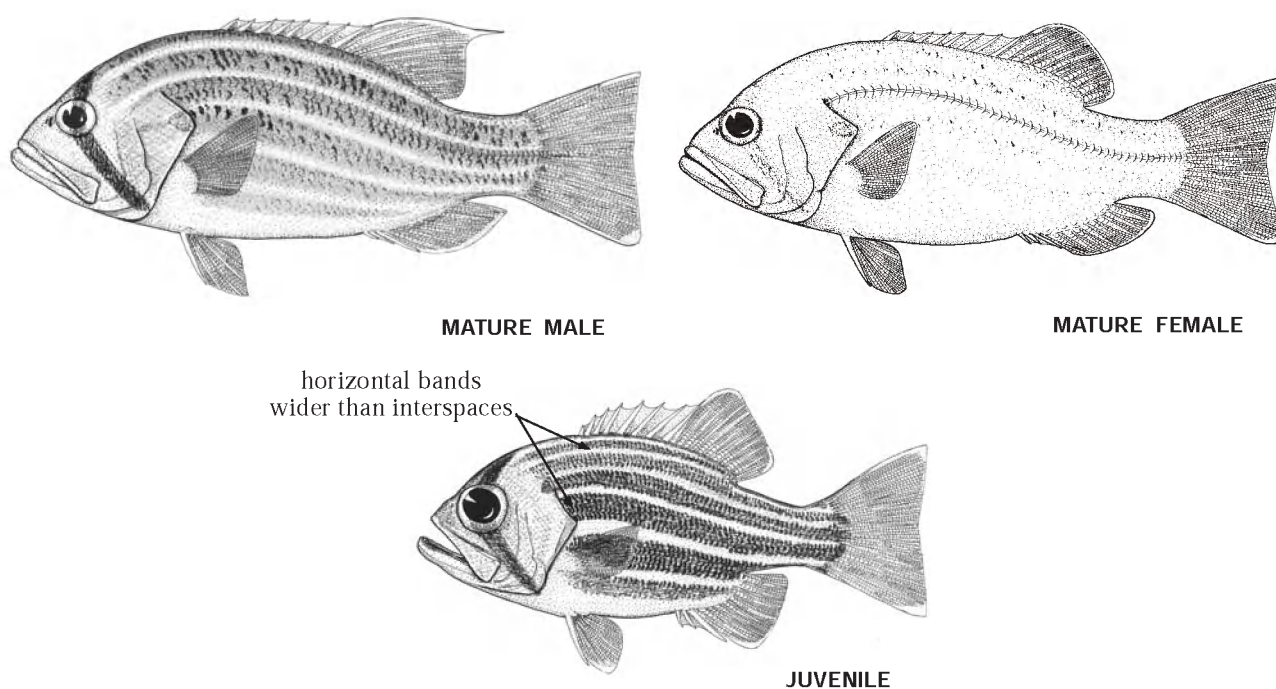


Fig. 10 *Glaucosoma hebraicum*

2.3 Information by Species

Glaucosoma Temminck and Schlegel, 1844

GLAUC Glauc

Genus: *Glaucosoma* Temminck and Schlegel, 1844:62; 1850:317. Type species *Glaucosoma bürgeri* Richardson, 1845, by subsequent designation (Jordan, 1919:216).

Synonyms: *Breviperca* Castelnau, 1875:6 (type species *Breviperca lineata* Castelnau, 1875, by monotypy). *Reganichthys* Ogilby, 1915:123 (type species: *Reganichthys magnificus* Ogilby, 1915, by monotypy). *Brachyglaucosoma* Fowler, 1934:357 (type species *Brachyglaucosoma taeniatus* Fowler, 1934, by original designation).

Diagnostic Features: As for family.

Remarks: Fowler (1934) erected his new genus *Brachyglaucosoma* on the basis of possessing longitudinal dark bands parallel with the course of the lateral line, a coloration shared by most species of juvenile and adolescent *Glaucosoma*.

Glaucosoma buergeri Richardson, 1845

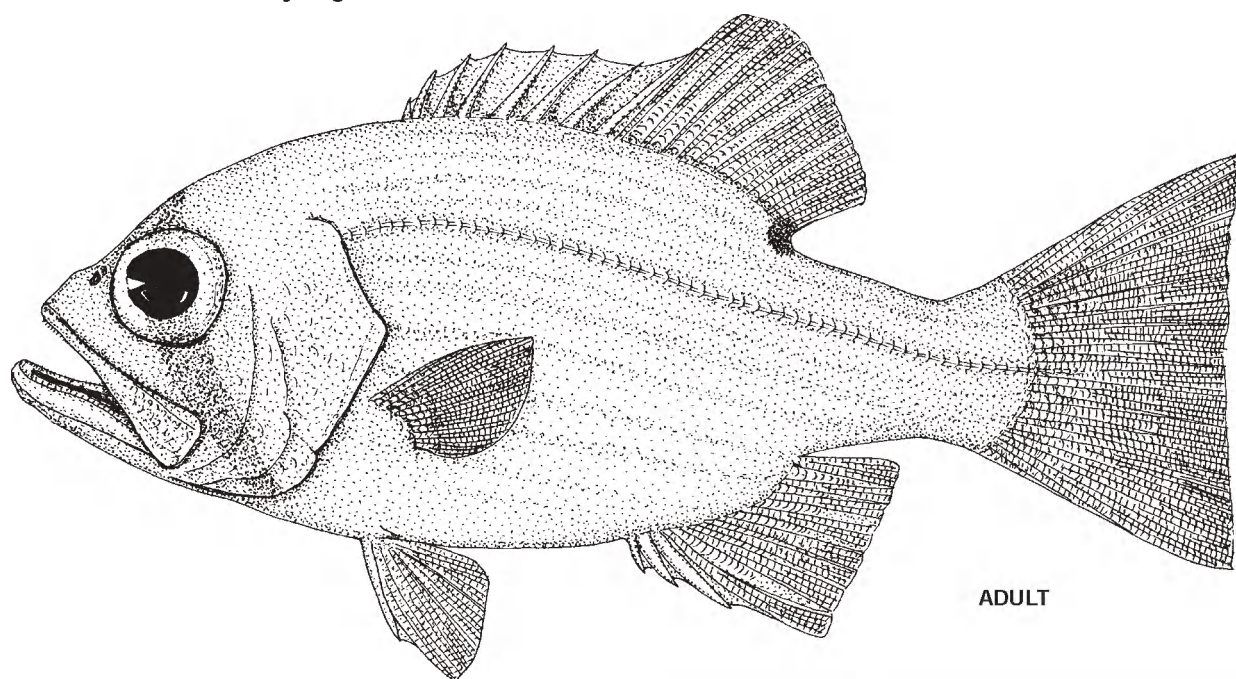
Fig. 11

GLAUC Glauc 1

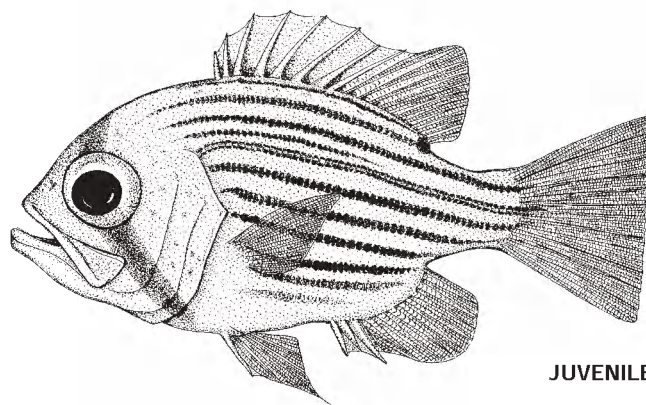
Glaucosoma bürgeri Richardson in Richardson and Gray, 1845, *Zool.Voy.Erebus and Terror, Ichth.*, :27 (on description and drawing *Glaucosoma* sp. Temminck and Schlegel, 1844:62, pl. 27; type locality: south west coast of Japan).

Synonyms: *Glaucosoma fauvelii* Sauvage, 1881, *Bull.Soc.Philomath.Paris*, (7)5:104 (Swatow, China); Fowler, 1931:84 (descr. after Sauvage). *Glaucosoma taeniatus* Fowler, 1934, *Proc.Acad.Nat.Sci.Philadelphia*, 85:357-358 (east of Masbate Island in 80 fathoms). *Glaucosoma bürgeri*: Bleeker, 1874:150 (China); Jordan and Evermann, 1903:342, fig. 15 (Keerun, Taiwan); Jordan and Richardson, 1910:185, fig. 13 (Takao, Taiwan); Jordan and Thompson, 1911:440, fig. 1 (Keerun, Taiwan). Fowler, 1931:83-84 (part; in synonymy of *G. hebraicum*); *Glaucosoma burgeri*: Sainsbury et al., 1985:138 (col. pl.:139; *G. buergeri* in addendum); Allen and Swaintson, 1988:62, No. 347, pl. 22; *Glaucosoma buergeri*: Gloerfelt-Tarp and Kailola, 1984:141, col. pl.:140; *Glaucosoma hebraicum* non Richardson: Masuda et al., 1984:142, pl. 127-A; Lee et al., 1987:195-200.

FAO Names: En - Grey bigmouth bream.



ADULT



JUVENILE

Fig. 11 *Glaucosoma buergeri*

Diagnostic Features: Body robust, moderately compressed, its depth 1.9 to 2.3 times in standard length. Head almost entirely scaled, profile with a slight concavity before eye, length 2.1 to 2.9 in standard length; snout short, its length 3.5 to 4.4 in length of head; eye large, its diameter 2.9 to 3.7 in head length; interorbital space convex, its width 3.9 to 4.8 in head length; preorbital width less than eye diameter (1.9 to 2.7 in eye) and 6.6 to 7.8 in head length; mouth large, oblique, reaching to about the posterior margin of the eye; maxillary bone scaled, with a thin supplementary bone above, its width at the end 4.7 to 5.5 in head length and 1.4 to 1.8 in eye diameter; teeth small and canine like in several rows in the upper jaw and in a single series at the side of the lower jaw, no enlarged canines; a narrow V-shaped band of fine teeth on the vomer. Gill rakers 6-9 + 13-15. Dorsal fin with VIII spines increasing in length from a small anterior spine to a long posterior one; soft dorsal rays 11, much higher than spinous part and with the anterior ray often produced into a filament; anal fin with III slender spines and 9 soft rays; pectoral rays 16; caudal fin slightly emarginate with pointed tips. Lateral line almost straight with 49 to 51 (usually 50) tubed scales extending onto base of caudal fin; 12 scale rows between lateral line and origin of dorsal fin. **Colour:** Body silvery grey with about 10 longitudinal thin bands, much less than the diameter of the pupil and less than their interspaces (bands become indistinct or completely disappear with age); a vertical broad dark band from nape, curving through eye to lower opercular angle and continued on subopercle; back at base of last dorsal ray usually with a dark blotch; roof of mouth with black mottling, coalescing lines, or completely black, tongue with black mottling, gill rakers black; peritoneum black (in dead specimens the black peritoneum may be slightly everted through the vent); fins greyish. Juveniles with the narrow dark bars and eye-stripe well defined.

Geographical Distribution: Western Australia from Koks Island, Shark Bay northwards to Cape Talbot (Fig. 12); Japan from Kochi Prefecture, Ryukyu Islands southwards and along the north China coast to Taiwan and Viet Nam.

Habitat and Biology: Coastal waters in moderate depths on the continental shelf, generally close to reefs or rough bottom.

Size: Maximum total length about 45 cm; common to 35 cm. Maximum weight about 2.5 kg.

Interest to Fisheries: Taken by bottom trawls and line. Marketed fresh, a small quantity is salted.

Local Names: AUSTRALIA: Deepsea jewfish, North-west jewfish; North-west pearl perch. JAPAN: Aobadai.

Literature: Burgess and Axelrod (1974:1255, col. pl. 253); Eggleston in Fischer and Whitehead (1974, Glauco 1); Gloerfelt-Tarp and Kailola (1984:141, col. pl. :140); Sainsbury et al., 1985:138, 139 col. figs.).

Remarks: Masuda et al. (1984), Shen (1984) and Chen and Yu (1986) treated *G. buergeri* as a junior synonym of *G. hebraicum*, but retained *G. fauvelii* as a separate species. Lee et al. (1987) compared the thin-lined juvenile of *G. buergeri* (as *G. fauvelii*) with the adult and concluded that it was indeed the juvenile, but regarded the species as *G. hebraicum*.

Although commonly called north-west pearl perch in Western Australia, this fish lacks the pearly suprascapular bone that is obvious in the pearl perch (*G. scapulare*). In the market the two species can be readily distinguished by the presence or absence of this "shoulder bone."

A series from north-western Western Australia was compared with a specimen from Viet Nam.

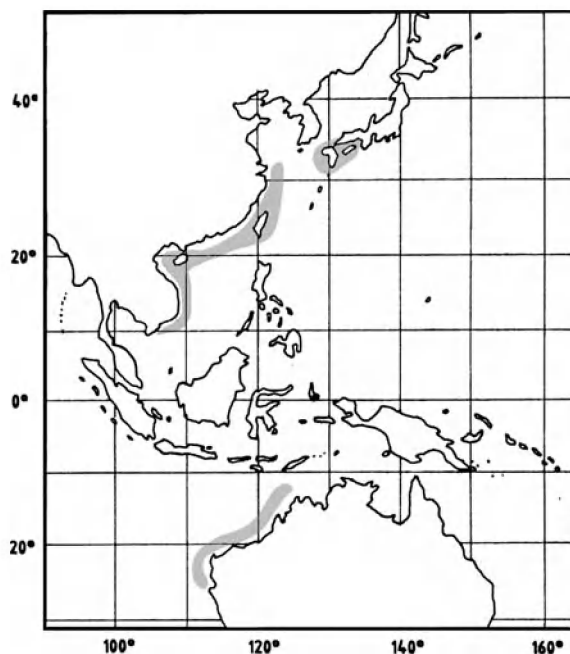


Fig. 12

***Glaucosoma hebraicum* Richardson, 1845**

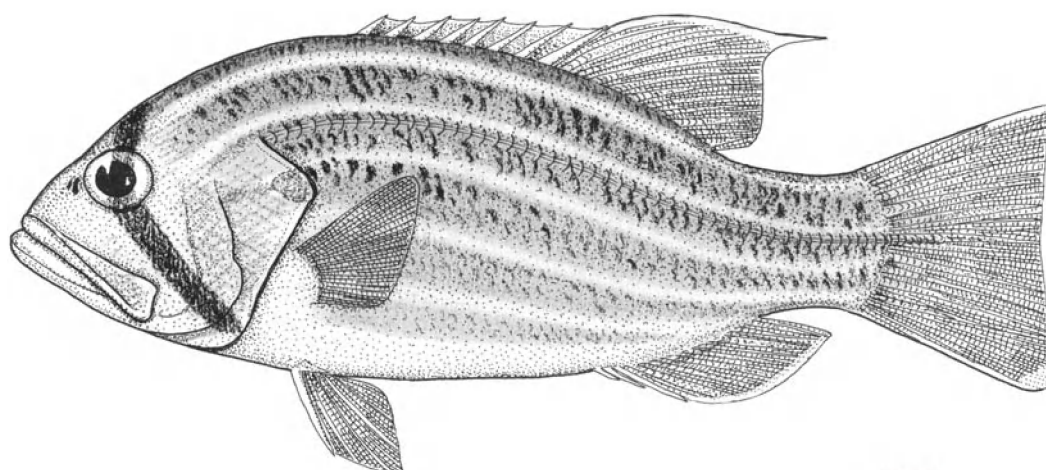
Fig. 13

GLAUC Glauc 2

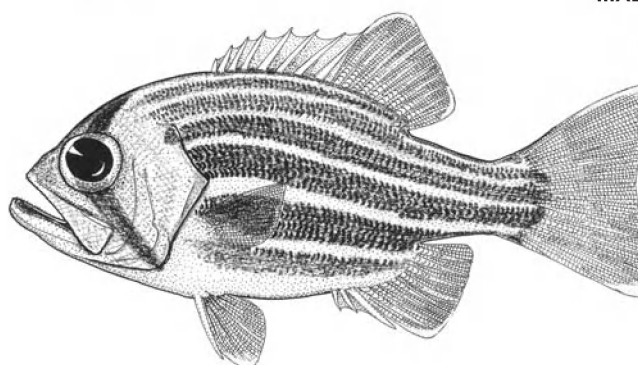
Glaucosoma hebraicum Richardson, 1845, Zool.Voy.Erebus and Terror,Ichth.,:27, pl. 17 (type locality: Houtman Abrolhos, Western Australia).

Synonyms: *Glaucosoma bürgeri* (non Richardson): Günther, 1859:211-212 (Houtman's Abrolhos, Jewfish). *Breviperca lineata* Castelnau, 1875:6 (Swan River, Western Australia)[taxonomic decision of McCulloch (1929-30)]. *Glaucosoma hebraicum*: Macleay, 1881:33-34; McCulloch, 1929-30:198; Fowler, 1931:83-84 (part); Coleman, 1980:132 (biology, col. pl. adult); Allen, 1985:2224, col. pl. 154; Hutchins and Swainston, 1986:52, pl. 247, 247 juv.; Grant, 1987:152-153, No. 353, col. pl. 353 (juvenile coloration).

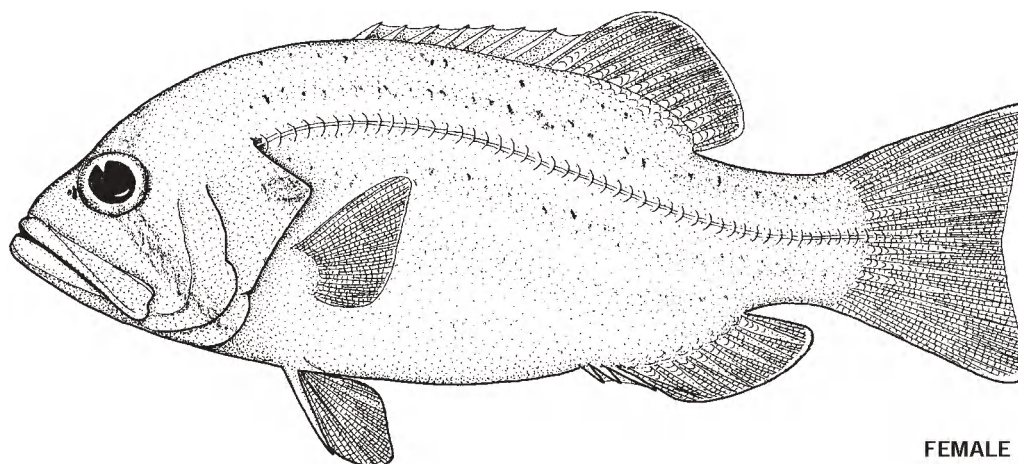
FAO Names: En - Western jewfish



MALE



JUVENILE



FEMALE

Fig. 13 *Glaucosoma hebraicum*

Diagnostic Features: Body robust, moderately compressed, its depth 2.3 to 2.5 times in standard length. Head almost entirely scaled, profile with a slight concavity before eye, length 2.6 in standard length; snout short, its length 3.6 to 3.8 in length of head; eye large, its diameter 3.7 to 4.0 in head length; interorbital space convex, its width 4.0 to 4.6 in head length; preorbital width less than eye diameter (2.0 to 2.5 in eye) and 7.3 to 10.1 in head length; mouth large, oblique, reaching to about the posterior third of the eye; maxillary bone scaled, with a thin supplementary bone above, its width at the end 5.2 to 5.8 in head length and 1.4 in eye diameter; teeth small and canine like in several rows in the upper jaw and in a single series at the side of the lower jaw, no enlarged canines; a narrow V-shaped band of fine teeth on the vomer. Gill rakers 4-6 + 11-13. Dorsal fin with VIII spines increasing in length from a small anterior spine to a long posterior one; soft dorsal rays 11, much higher than spinous part and with the 4th ray produced into a filament in mature males; anal fin with III slender spines and 9 soft rays; pectoral rays 16; caudal fin slightly emarginate with pointed tips. Lateral line almost straight with 44 to 48 (usually 45) tubed scales extending onto base of caudal fin; 10 scale rows between lateral line and origin of dorsal fin, 17 to 20 below the lateral line. **Colour:** Body silvery grey with bronze and lilac to lavender reflections, becoming spotted or with scattered small black blotches on upper sides; about 6 longitudinal broad bands along the body, wider than the diameter of the pupil and wider than their interspaces (bands become indistinct or completely disappear with age); a vertical broad dark band from nape, curving through eye to lower opercular angle and continued on subopercle; back at base of last dorsal ray without a dark spot; roof of mouth, tongue and peritoneum without black mottling, gill rakers pale; fins greyish with white margins in juveniles which persist in larger examples when alive. Mature males with the elongate fourth soft ray of the dorsal fin white. Juveniles with the broad dark bars (wider than interspaces) and eye-stripe well defined.

Geographical Distribution: Western Australia from Koks Island, Shark Bay southwards to Cape Leeuwin (Fig. 14) and occasionally eastwards to Albany, Recherche Archipelago and Cape Pasley.

Habitat and Biology: Coastal waters in moderate depths on the continental shelf, particularly close to deep submerged reefs or rough bottom. Occurring in small schools or more commonly as individuals inshore. In shallow waters to 27 m the Jewfish bites best at night, but in deeper waters to 120 m this fish may be taken at all times of the day. They rarely move away from rocky reef areas and are commonly taken near caves, overhanging ledges and on hard bottom. The fish frequents the bottom and will rarely move up into the water column. Best fishing baits are squid heads, skinned and split octopus tentacle, split parrotfish, small whiting, crayfish, and best of all, fresh hermit crab taken from lobster pots. In the Bunbury area the flesh of the estuarine plotosid catfish *Cnidoglanis* is considered a superior bait. Marr (1980) described this species as a piscivore preying primarily on reef dwelling fishes, particularly wrasses of the family Labridae and palinurid rock lobsters. Robinson (1987) found the diet to consist of fishes, mainly wrasses and reef eels (family Muraenidae), with molluscs (squid, octopus and cuttlefish) and crustaceans (rock lobster, prawns and crabs). The observations of the author at Lancelin Island indicate wrasse, octopus, moray eels and leatherjacket with rock lobster taken opportunistically when undersized lobsters are returned alive on hauling the lobster pots. Smaller jewfish have not been recorded from the gut contents of adults.

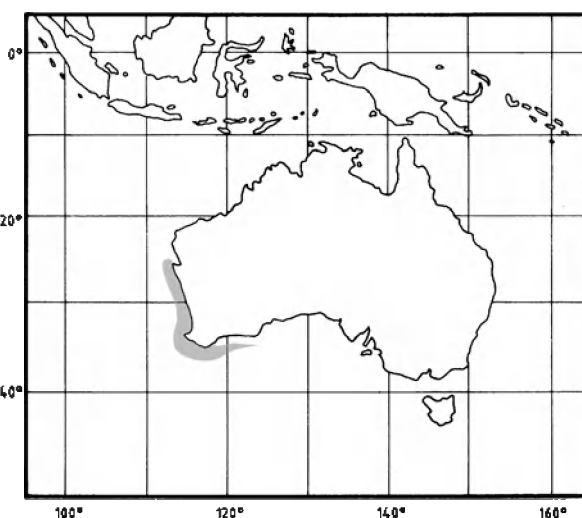


Fig. 14

Spawning takes place on rocky bottom in 40 to 50 m from late November to February (late March at the Houtman Abrolhos Islands), with a peak between January and February. Jewfish inhabiting deep water move up into the spawning grounds in late November and early December, males usually first, females a month later. The smallest female observed in spawning condition was 58.5 cm and weighed 5.4 kg; the smallest male observed in spawning condition measured 52.0 cm and weighed 2.5 kg, but the onset of sexual maturity probably occurs at smaller sizes (Moy, 1986). During the prespawning period males outnumber females three to one. By January the movement into the shallower spawning grounds of both sexes is well underway. Males are distinguished by the elongate white ray on the soft dorsal fin; the mature female has this part of the fin more rounded. The deepwater fish are easily recognised by their shiny appearance. During late December to early March, sometimes in late April in warmer waters, Jewfish are caught running ripe on the spawning grounds, and females may be more abundant than males. Very few ripe fish are taken in waters of less than 25 m. The fish school during the day and feed at night. Sometimes large catches can be made on "spawning patches" which are usually isolated patches of reef. The female has large roes containing a large number of very small eggs. Fecundity increases with size and up to 4 million eggs were estimated in fish of 81 to 87 cm. The observed range of absolute fecundity ranged from 300 000 to 2.9 million and the potential fecundity was up to 6.8 million (Marr, 1980 in Sudmeyer et al., 1994; Moy, 1986). Following the spawning period fishing is very poor and from late March to early May catches are down. The fish disperse and some large fish are taken close inshore as the fish recommence feeding. The very large fish are frequently males. The large fish generally take the bait first and when they are removed the smaller ones are taken. Small fishing grounds are easily overfished and require 2 to 3 years to recover. Before the appearance of aluminium boats and large outboard motors, professional fishermen jealously guarded the bearings to profitable patches that were fished only once in a season. With modern echosounding equipment and numerous recreational fishing craft the small reef areas in deeper water are now heavily exploited.

It is well known to scuba divers that the fish is territorial for most of the year, choosing a particular part of the reef. In shallow water it is not uncommon for a large fish to take residence in a cave or within a wreck and remain there for some years. Jewfish were once taken in shallow water by observing the individual fish through a glass-bottomed bucket and watching it take the bait before setting the hook. Most of the inshore fish have been taken in recent years.

Size: Maximum total length about 122 cm; common to 80 cm. Maximum weight reported to be about 32 kg, but the maximum recorded is 26 kg. The minimum legal length in Western Australia is 50 cm total length.

Interest to Fisheries: Taken by handline and to a lesser extent by spear, longlining and gill netting. Small fisheries occur throughout its range, mainly centred near Bunbury, Ledge Point-Lancelin, Abrolhos Islands and Geraldton. This very fine tablefish is eagerly sought by recreational anglers and the recreational catch may exceed the commercial catch (Sudmeyer, et al., 1994) and the stock may be in danger of overfishing. It is marketed fresh in Western Australia and fetches a high price.

The usual handline fishing practice is to locate suitable bottom and stop the boat on the upwind side and drift slowly across with lines on the bottom. Fishermen tie the hook on long nylon leaders well above the sinker so that the bait hangs just above the sinker, but drifts free when fishing. It is important to maintain sinker contact with the bottom at all times as the larger fish are very reluctant to rise up from the bottom to take the bait. The Jewfish is a finicky biter and usually holds the bait in the lips for awhile before macerating it in the pharyngeal teeth or "crunchers". The fisherman gives the fish a slack line as soon as a soft bite is felt in order to allow the fish to take the bait into the throat where a hard strike will set the hook. The most successful line fishers maintain a very gentle tension on the line at all times to feel the bite of a jewfish which is commonly referred to as a "nudge." The expert jewfisher can often feel a "nudge" undetected by the less experienced. However, it is not uncommon for the complete novice to catch fish as the bite is frequently not recognized at all and the fish is allowed to take

the bait completely; deeply hooked fish are regarded as a sign of the novice angler. The fish is hauled to the surface quickly to prevent the fish moving under a ledge or into a cave. The swimbladder expands rapidly on decompression and the fish rarely struggles at the surface. Large fish taken at night are sometimes covered with a phosphorescent mucous that quickly fades.

Table 1
Catch of Westralian jewfish in metric tonnes and value \$Aust.

YEAR	TONNES	VALUE \$AUST.
1982-83	188	753 000
1985-86	297	1 800 000
1986-87	206	1 600 000
1987-88	216	1 800 000

Source: Sudmeyer et al. (1994).

Local Names: AUSTRALIA: Dhufish, Jewfish, Westralian jewfish, Jewie; JAPAN: Aobadai.

Literature: Grant, 1987:153, col. pl. (juvenile coloration); Allen, 1985, col. pl. 154; Hutchins and Swainson, 1986:52, pl. 247 (adult and juvenile coloration).

Remarks: Günther (1959:211-212) compared the two syntypes of *G. hebraicum* in the British Museum with the figure of *G. bürgeri* published by Temminck and Schlegel (1843) and, without specimens of *G. buergeri*, was unconvinced of the validity of two species. Günther synonymised *G. hebraicum* and his action was followed by Fowler (1931:83-84) who regarded *G. bürgeri* as the junior synonym. This action was followed by numerous authors. There is no doubt that the two species are valid, but confusion has resulted in identifying the adults and the striped juveniles. The illustration of "*G. fauvel*" by Tomita in Burgess and Axelrod (1974; 1255, col. pl. 252) is clearly not *G. buergeri* and is probably that of *G. hebraicum*. Specimens from Western Australia were examined for the present study.

Glaucosoma magnificum (Ogilby, 1915)

Fig. 15

GLAUC Glauc 3

Reganichthys magnificus Ogilby, 1915, *Mem.Qd.Mus.*, **3**:123, pl. 30 (type locality: Thursday Island, Torres Strait); 1916:182 (from Pempheridae to ?Centropomidae).

Synonyms: *Glaucosoma magnificum*: Ogilby, 1916:182 (to *Glaucosoma*); McCulloch, 1929-30:198; Fowler, 1931:84 (as synonym of *G. scapulare*); Marshall, 1964:149 (key characters); Gloerfelt-Tarp and Kailola, 1984:141, col. pl.:140; Sainsbury et al., 1985:138 (col. pl.:139); Allen and Swainston, 1988:62, No. 348, pl. 22 (Australia and New Guinea).

FAO Names: En - Threadfin pearl perch.

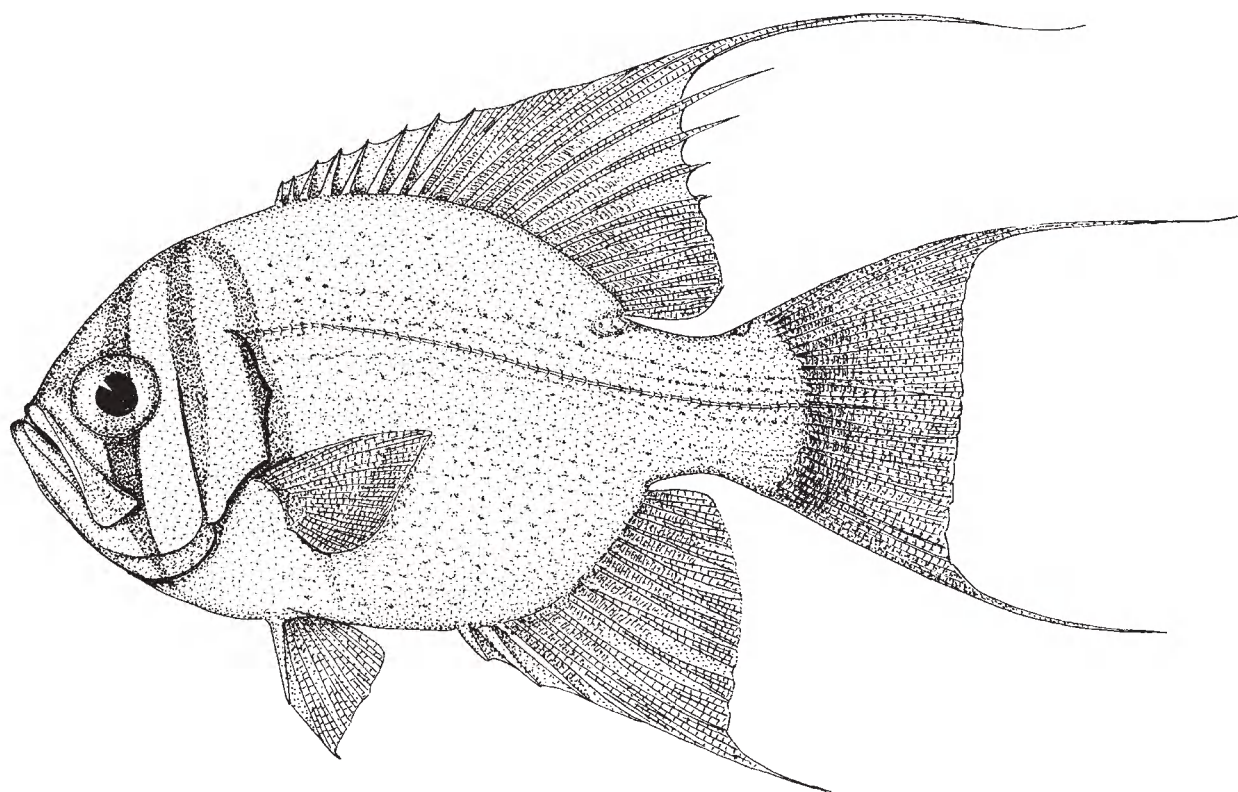


Fig. 15 *Glaucosoma magnificum*

Diagnostic Features: Body robust, moderately compressed, its depth 1.6 to 1.8 in standard length. Head almost entirely scaled, profile evenly rounded, length 2.6 to 2.8 in standard length; snout short, its length 5.0 to 5.7 in length of head; eye large, its diameter 2.3 to 2.6 in head length; interorbital space convex, its width 2.9 to 3.2 in head length; preorbital width less than eye diameter and 7.8 to 9.6 in head length; mouth large, oblique, reaching to about the middle of the eye; maxillary bone scaled, with a thin supplementary bone above, its width at the end 4.9 to 5.4 in head length and 1.9 to 2.3 in eye diameter; teeth small and canine-like in several rows in the upper jaw and in a single series at the side of the lower jaw, a few short broad canines at tip of jaws, those on the bottom jaws directed outward; a narrow V-shaped band of fine teeth on the vomer. Gill rakers 5-10 + 17-19. Dorsal fin with VIII spines increasing in length from a small anterior spine to a long posterior one; soft dorsal rays 14, much higher than spinous part and with the anterior ray produced into a short filament, the 3rd ray prolonged into a long simple filament which extends past the caudal fin and the fourth and fifth rays also extended to beyond the hypural joint; anal fin with III slender spines and 12 soft rays, the second ray prolonged beyond the caudal fin and the third ray almost as long in small specimens; pectoral rays 15 to 16, the supraclavicle not noticeably enlarged, covered with silvery membrane; caudal fin slightly emarginate with long filamentous tips. Lateral line almost straight with 46 to 48 tubed scales extending onto base of caudal fin; 14 to 16 scale

rows between lateral line and origin of dorsal fin, 23 to 24 below lateral line; dorsal and anal fins with bases scaly and small interradiial scales extending on proximal half of fins. Swimbladder broad, rounded to slightly lobate anteriorly, broadly grooved dorsally, with 7 or 8 narrow diagonal grooves dorsolaterally and tapering to a fine point posteriorly; the inner trapezoid muscle band shorter than in the other species of *Glaucosoma*. **Colour:** Body silvery grey to reddish brown with middle of scales golden to yellowish; upper surface of head lavender; a broad dark brown band running through the eye to the lower margin of opercle and onto subopercle; a second narrower band from the nape down the posterior edge of the preopercle; a third narrow band from the nape behind the second band and curving on the upper sides of the back down the posterior margin of the opercle to the pectoral fin; in life with a dark or lavender edged bright silvery spot on each side of the last dorsal ray and another on the posterior dorsal surface of the caudal peduncle; roof of mouth with dark bluish to black shading on the posterior part, tongue pale to dusky; gill rakers pale, dusky, or black with pale tips; peritoneum brown; fins greyish, filaments dark.

Geographical Distribution: Western Australia from Exmouth Gulf, Northern Territory to Torres Straits (Fig. 16), and around Cape York to Shelburne Bay, Queensland. Almost certainly present in southern Papua-New Guinea.

Habitat and Biology: Coastal waters in moderate depths on the continental shelf particularly close to submerged reefs or rough bottom. Schools of threadfin pearl perch can be observed in 8 to 10 m. Feeds on crustaceans; gut contents of a specimen from Torres Strait was a prawn *Metapenaeopsis* sp. Small cuttlefish are also taken.

Size: Maximum total length about 32 cm; common to 20 cm.

Interest to Fisheries: This small fish is sometimes taken in quantity by bottom trawls. The larger specimens are considered good eating.

Local Names: AUSTRALIA: Threadfin pearl-perch.

Literature: Burgess and Axelrod (1974:1254, col. pl. 251; Gloerfelt-Tarp and Kailola (1984:141, col. pl.:140); Sainsbury et al. (1985:138, col. pl.:139).

Remarks: Numerous specimens from Torres Straits were examined for the present study.

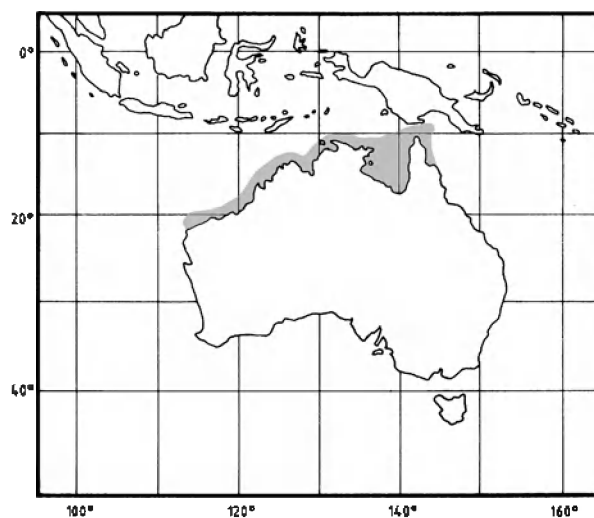


Fig. 16

Glaucosoma scapulare Ramsay, 1881

Fig. 17

GLAUC Glauc 4

Glaucosoma scapulare Ramsay in Macleay, 1881, Proc.Linn.Soc.N.S.W., 5:334-335, pl. 13 (type locality: Port Jackson).

Synonyms: *Glaucosoma scapulare*: Ogilby, 1893:15-16, pl. 3 (to 2 feet); 1916:182; Roughley, 1916:83; McCulloch, 1919:54, pl. 23, fig. 198 (New South Wales); McCulloch, 1929-30:198; Fowler, 1931:84; Marshall, 1964:149, pl. 33; Coleman, 1980:133 (behaviour, col. pl. adult); Hutchins and Swainston, 1986:52, col. pl. 248 (Yeppoon, Qld., to Seal Rocks, N.S.W.); Grant, 1987:152, No.352, col. pl. 352.

FAO Names: En - Pearl perch.

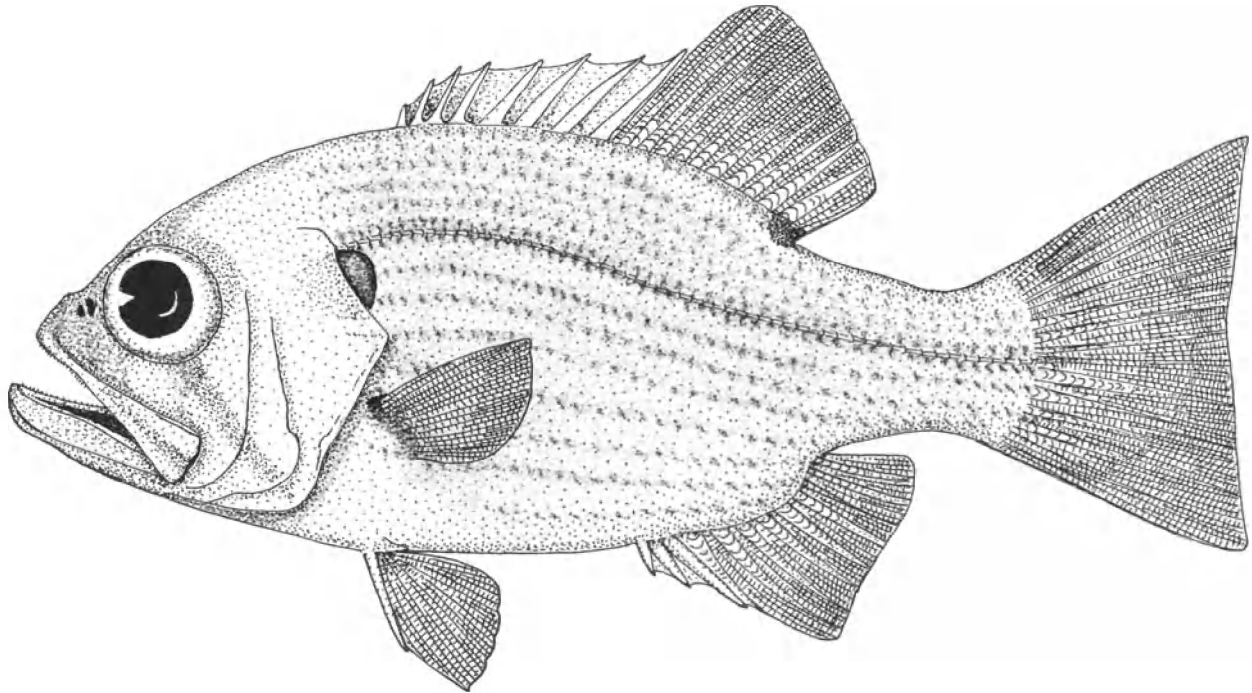


Fig. 17 *Glaucosoma scapulare*

Diagnostic Features: Body robust, moderately compressed, its depth 2.4 times in standard length. Head almost entirely scaled, profile with a slight concavity before eye, length 2.6 in standard length; snout short, its length 4.0 in length of head; eye large, its diameter 3.2 in head length; interorbital space convex, its width 4.0 in head length; preorbital width less than eye diameter, 7.7 in head length and 2.4 in eye diameter; mouth large, oblique, reaching to about the posterior margin of the eye; maxillary bone scaled, with a thin supplementary bone above, its width at the end 5.3 in head length and 1.7 in eye diameter; teeth small and canine like in several rows in the upper jaw and in a single series at the side of the lower jaw, no enlarged canines; a narrow V-shaped band of fine teeth on the vomer. Gill rakers 6 + 15-17. Dorsal fin with VIII spines increasing in length from a small anterior spine to a long posterior one; soft dorsal rays 11, much higher than spinous part; anal fin with III slender spines and 9 soft rays; pectoral-fin rays 16, the supraclavicle (suprascapulary) large, dome-shaped and covered with a black membrane when alive, but exposed as a pearly-white smooth bone in the market; caudal fin slightly emarginate with pointed tips. Lateral line almost straight with 49 to 50 tubed scales extending onto base of caudal fin; 10 scales between lateral line and origin of dorsal fin, 20 to 22 below. **Colour:** Body silvery grey, scales with a small indistinct golden-brown spot at base; head and back with lavender reflections; an indistinct curved brown band from nape passing through eye to lower opercular angle and continued on subopercle is present on juveniles only; tip of lower jaw dark; supraclavicle deep iridescent blue-black or steel-grey, becoming pearl-

white when the thin membrane is removed; scales of back and upper sides with a small indistinct golden-brown to dark fawn spot; dorsal surface at base of last dorsal ray usually with a dark blotch; pectoral fin hyaline with a small brown or black spot on inner base (axillary spot); membranes of dorsal and caudal fin pale, the rays white; anal fin hyaline with rays silvery or pale fawn; pelvic fins hyaline, rays milk-white. Roof of mouth posterior to vomer, pharyngeals, gill rakers and hyoid area black; tongue pale, with very fine black striations; inner jaws pale cream; inner and outer branchiostegal membranes white; mandibular frenum and associated membranes white; peritoneum brown to smoky; fins greyish. Juveniles with the narrow dark bars and eye-stripe well defined.

Geographical Distribution: Queensland from Rockhampton southwards to Port Jackson, New South Wales (Fig. 18).

Habitat and Biology: Coastal waters in moderate depths to 90 m on the continental shelf particularly close to submerged reefs, rock ledges or rough bottom. Reported to move into shallow offshore waters during the day, usually adjacent to rock faces, gutters and terraces of bombores and islands. It seems to prefer places of high water movement in shallow water, yet seeks the protection of isolated reefs in gutters and channels when observed by divers in deeper waters. The pearl perch tends to stay in one area for up to six months, and although individuals are observed, most are seen in small groups or schools (Coleman, 1980). Catches of up to 20 individuals may be taken in quick succession. This species is stated to be a midwater feeder moving well up from the bottom in a shoal to take a bait during the night until about 10 pm (Grant, 1987). Most fish are taken on the bottom during the day.

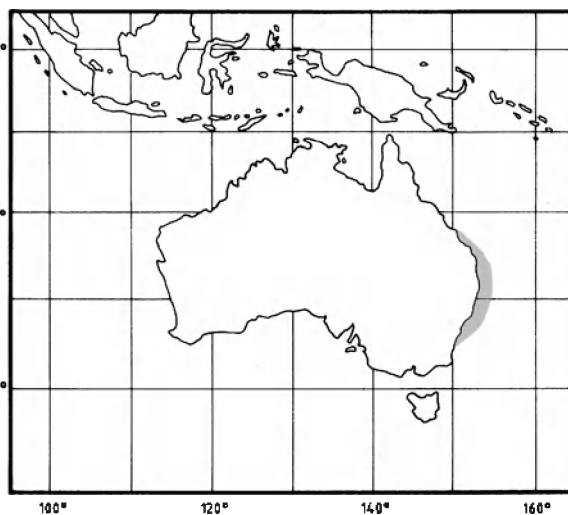


Fig. 18

The inside of the mouth is black and may be luminescent at night.

Size: Maximum total length about 70 cm; common to 35 cm. Two large pearl perch were taken on the 35 fathom reefs east of Moreton Bay, July, 1991 weighing 5.4 kg and 7.3 kg (12 lbs and 16 lbs).

Interest to Fisheries: Taken by handline. The pearl perch is highly regarded as a foodfish in Queensland and New South Wales. Incidental catches are taken throughout its range with some large catches off Mooloolaba, southeast Queensland.

Local Names: AUSTRALIA: Pearl perch, Epaulette fish, Nannygai (Queensland only).

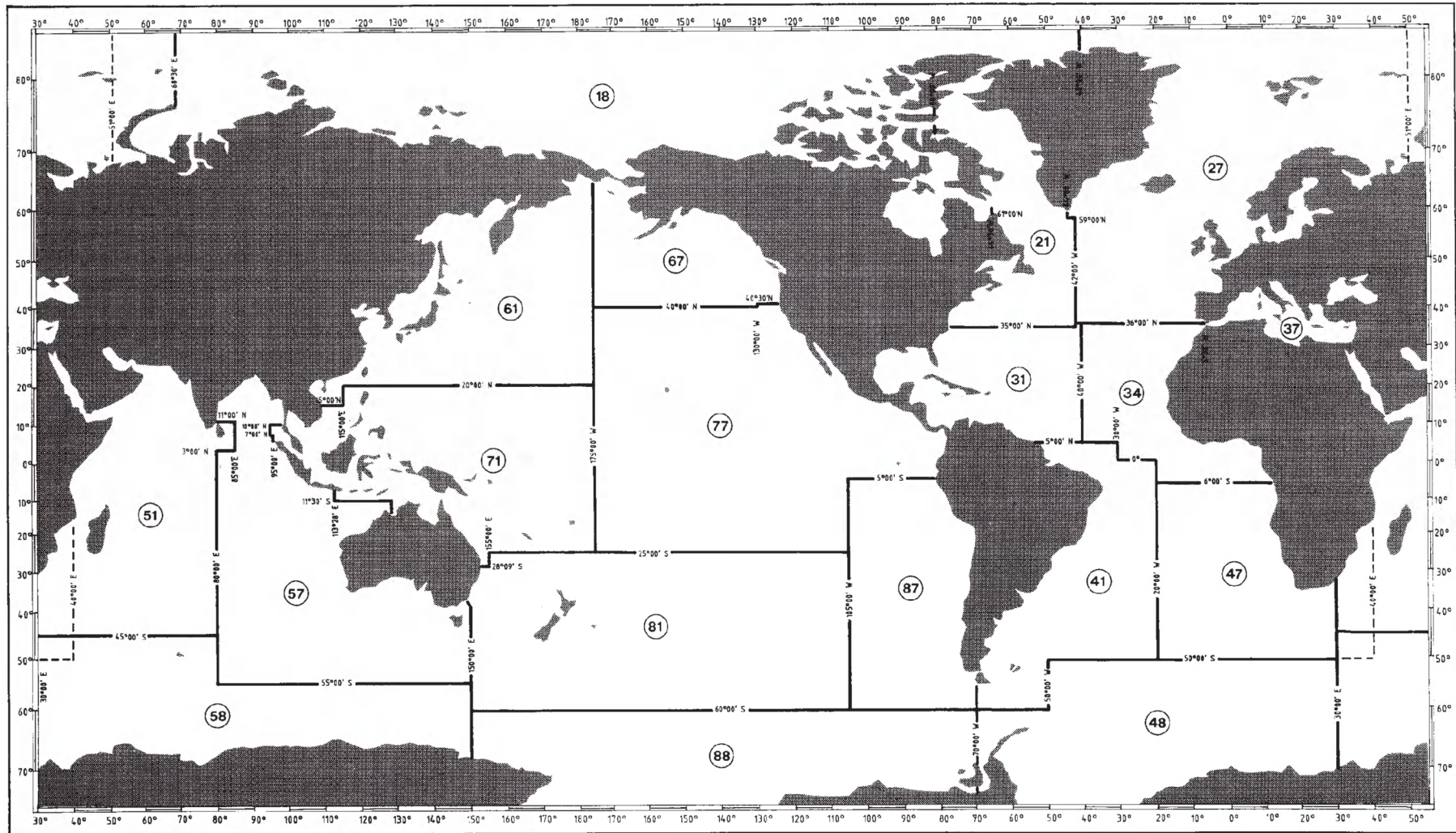
Literature: Grant (1987).

Remarks: Ogilby (1916) cited the author of *G. scapulare* as Ramsay in Macleay. All authors since McCulloch (1929-30) have cited Macleay as the author of this species (Paxton et al., 1989). The 1985 edition of the *International Code of Zoological Nomenclature* states in Article 50(a) "If it is clear from the contents of the publication that only one of joint authors, or some other person, is alone responsible for both the name and for satisfying the criteria of availability other than publication, then that person is the author of the name". The original description of *G. scapulare* gives the name as "*Glaucosoma scapulare*, Ramsay, (M.SS.)" and states below "One specimen of this curious fish was brought to Mr. Ramsay of the Australian Museum a few weeks ago. As far as is known it is unique." This clearly defines Ramsay as the author of the species as was the intention of Macleay.

3. LIST OF SPECIES BY MAJOR FISHING AREAS

SPECIES	CODE	GEOGRAPHICAL DISTRIBUTION			
		MAJOR FISHING AREAS FOR STATISTICAL PURPOSES			
		57	61	71	81
<i>Glaucosoma buergeri</i>	GLAUC Glauc 1	●	●	●	
<i>Glaucosoma hebraicum</i>	GLAUC Glauc 2	●			
<i>Glaucosoma magnificum</i>	GLAUC Glauc 3	●		●	
<i>Glaucosoma scapulare</i>	GLAUC Glauc 4			●	●

MAJOR MARINE FISHING AREAS FOR STATISTICAL PURPOSES



4. BIBLIOGRAPHY

- Abordi, J. 1986. The Reproductive Biology of the Westralian Jewfish, *Glaucosoma hebraicum* (Pisces: Glaucosomidae), Part I. Gonad Morphology. School of Biology, Curtin University of Technology, Western Australia. Biology Project 301/302: 66 pp. (mimeo).
- Allen, G.R. 1985. *Fishes of Western Australia*. Pacific Marine Fishes Book 9 (eds. Burgess, W.E. and H.R. Axelrod). T.F.H. Publ., New Jersey. pp. 2205-2534. pls. 526.
- Allen, G.R. and R. Swainston. 1988. *The Marine Fishes of North-western Australia. A field Guide for Anglers and Divers*. Western Australian Museum, pp. 201, col. pls. 1200.
- Burgess, W. and H.R. Axelrod. 1974. *Pacific Marine Fishes Book 5*. T.F.H. Publ., New Jersey. pp. 1113-1381. pls. 456.
- Chen, J.T.F. and M.J. Yu. 1986. *A synopsis of the vertebrates of Taiwan*. (2nd rev. and enl. ed.). Vols. 1-2. Commercial Book Co., Taipei.
- Coleman, N. 1980. *Australian Sea Fishes South of 30*. (Doubleday and Co. Ltd:Sydney) 302 p.
- Eggleston, D. 1974. Glaucosomidae (unpaged), in Fischer, W. and P.J.P. Whitehead (eds.), *FAO species identification sheets for fisheries purposes. Eastern Indian Ocean (Fishing Area 57) and Western Central Pacific (Fishing Area 71)*. Vol. 2 (unpaged). Rome, FAO.
- Fowler, H.W. 1931. Contributions to the biology of the Philippine Archipelago and adjacent regions. The fishes of the families Pseudochromidae, Lobotidae, Pempheridae, Priacanthidae, Lutjanidae, Pomadasyidae and Teraponidae, collected by the United States Bureau of Fisheries steamer "Albatross", chiefly in Philippine Seas and adjacent waters. *Bull. U.S. natn. Mus.*, 100(11):1-388, 29 figs.
- Gloerfeldt-Tarp, T. and P.J. Kailola. 1984. *Trawled fishes of southern Indonesia and northwestern Australia*. Australian Development Assistance Bureau, Australia, Directorate General of Fisheries, Indonesia, German Agency for Technical Cooperation, Germany. 406 p.
- Grant, E.M. 1965. *Guide to Fishes*. (Brisbane:Dept. Harbours and Marine):1-280, ill.
- Grant, E.M. 1982. *Guide to Fishes*. (Brisbane:Dept. Harbours and Marine) 896 p. ill.
- Grant, E.M. 1987. *Fishes of Australia*. (E.M. Grant Pty Ltd:Brisbane) 480 p. 909 col.ill. 7 pls. 910 figs.
- Greenwood, P.H., D.E. Rosen, S.H. Weitzman, and G.S. Myers. 1966. Phyletic studies of teleostean fishes, with a provisional classification of living forms. *Bull.Amer. Mus.Nat.Hist.*, 131(4):341-455.
- Günther, A. 1859. *Catalogue of the acanthoperygian fishes in the collection of the British Museum*, 1:1-524. (Taylor and Francis:London).
- Hutchins, B. and R. Swainson. 1986. *Sea fishes of Southern Australia. Complete field guide for anglers and divers*. Swainson Publishing, Perth. 180 p.
- Johnson, G.D. 1975. The procurent spur: an undescribed perciform caudal character and its phylogenetic implications. *Occ.Pap.Calif.Acad. Sci.*, 121:1-23.
- Johnson, G.D. 1993. Percomorph phylogeny: progress and problems. *Bur.Mar.Sci.*, 52(1):3-28.

- Katayama, M. 1954. Systematic position of the genus *Glaucosoma*. *Bull.Fac.Edu.,Yamaguchi Univ.*, 4(1):23-29.
- Lee, S.-C., S.C.M. Tsoi, and W-C. Chao. 1987. Systematic status of the fishes of *Glaucosoma* in Taiwan. *Bull.Inst.Zool.Acad.Sin.* (Taipei), 26(3): 195-200.
- Macleay, W. 1881. *Descriptive Catalogue of Australian Fishes*. (Sydney: F.W. White), 1:1-264; 2:1-324.
- Marr, F. 1980. Growth, Reproduction and Dietary Preference of the Jewfish, *Glaucosoma hebraicum*. School of Biology, Curtin University of Technology, Western Australia. Biology Project 301/302: 41pp. (mimeo).
- Marshall, T.C. 1964. *Fishes of the Great Barrier Reef and Coastal Waters of Queensland*. Angus and Robertson Ltd., Sydney, 566p.
- Masuda, H., C. Araga, and T. Yoshino (eds). 1975. *Coastal fishes of Southern Japan*. Tokai Univ. Press, Tokyo, 379 p.
- Masuda, H., K. Amaoka, C. Araga, T. Uyeno, and T. Yoshino (eds). 1984. The fishes of the Japanese Archipelago. Tokai Univ. Press, Tokyo, 437 p.
- McCulloch, A.R. 1921. Check list of the fish and fish-like animals of New South Wales. Part 2. *Aust. Zool.*, 2(2):14-58, pls 4-24.
- McCulloch, A.R. 1929-30. A check-list of the fishes recorded from Australia. *Aust. Mus. Mem.* 5:i-x, 1-534.
- McCulloch, A.R. and G.P. Whitley. 1925. A list of the fishes recorded from Queensland waters. *Mem. Qd Mus.* 8(2): 125-182.
- Moy I. 1986. The Reproductive Biology of the Westralian Jewfish, *Glaucosoma hebraicum* (Pisces: Glaucosomidae), Part II. Gonadal Analysis. School of Biology, Curtin University of Technology, Western Australia. Biology Project 301/302: 66 pp. (mimeo).
- Ogilby, J.D. 1886. *Catalogue of the fishes of New South Wales with their principal synonyms*. pp. 67. (Govt. Printer: Sydney).
- Ogilby, J.D. 1893. *Edible Fishes and Crustaceans of New South Wales*. pp. 212, pls 51. (Govt. Printer: Sydney).
- Ogilby, J.D. 1916. On some new or little-known Australian fishes. *Mem. Qd Mus.*, 3:117-129.
- Ogilby, J.D. 1954. *The commercial fishes and fisheries of Queensland*. (Brisbane: Dept. Harbours and Marine): 1-222, figs 1-222.
- Ogilby, J.D. 1964. A survey of Australian ichthyology. *Proc. Linn. Soc. N.S.W.* 89:11-127.
- Parkinson, W.D. 1989. A Proposal for the Induction of Spawning in the Westralian Jewfish, *Glaucosoma hebraicum* (Richardson, 1845) (Glaucosomidae). School of Biology, Curtin University of Technology, Western Australia. Third Year Student Report: 4 pp. (mimeo).
- Paxton, J.R., D.F. Hoese, G.R. Allen, and J.E. Hanley. 1989. Zoological Catalogue of Australia, Vol. 7, Pisces, Petromyzontidae to Carangidae. Australian Biological Resources Study, Canberra. 665 p.
- Regan, C.T. 1913. On the classification of the percoid fishes. *Ann.Mag.Nat.Hist.*, Ser. 8, 12:111-145.

- Richardson, J. and J.E. Gray (eds.) (1844-1875). *Zoology of the Voyage of H.M.S. Erebus and Terror, under the Command of Captain Sir James Clark Ross, R.N., F.R.S., during the years 1839-1843*. Reptiles, Fishes, Crustacea, Insects, Mollusca, Vol. 2. E.W. Janson, London: 27-30.
- Robinson, R.G. 1987. The Morphology and Histology of the Alimentary Tract: the Dietary Preference of Western Australian Jewfish, *Glaucosoma hebraicum*. School of Biology, Curtin University of Technology, Western Australia. Third Year Student Report: 46 pp. (mimeo).
- Sainsbury, K.J., P.J. Kailola, and G.G. Leyland. 1984. *Continental shelf fishes of northern and north-western Australia, an illustrated guide*. Clouston and Hall and Peter Pownell Fisheries Information Service, Canberra: 1-375.
- Shen, S.C. 1984. *Synopsis of fishes of Taiwan*. Southern Materials Centre, Taipei. 533 pp.
- Sudmeyer, J.E., D.A. Hancock, and R.J.C. Lenanton. 1994. Synopsis of Westralian Jewfish (*Glaucosoma hebraicum*, Richardson, 1845) (Pisces: Glaucosomatidae). Fisheries Research Report No. 96. Fisheries Research Division, Fisheries Dept. W. Aust.
- Temminck, C.J. and H. Schlegel. 1843. Pisces, 324 p., 144 pls. in: Ph. Fr. von Siebold, *Fauna Japonica*. Lugdumi Batavorum, Batavia.
- Tominaga, Y. 1968. Internal morphology, mutual relationships and systematic position of the fishes belonging to the family Pempheridae. *Japanese Journal of Ichthyology*. 15(2):43-95.
- Tominaga, Y. 1986. The relationships of the families Glaucosomatidae and Pempheridae. In: Uyeno, T., Arai, R., Taniuchi, T., Matsuura, K. (eds.), *Indo-Pacific Fish Biology*. Proceedings of the Second International Conference on Indo-Pacific Fishes, Tokyo National Museum, Uenopark, Tokyo, July 29-August 3, 1985: 595-599.

5. INDEX OF SCIENTIFIC AND VERNACULAR NAMES

Explanation of the System

- Italics* : Valid scientific names (genera and species).
- Italics* : Synonyms (genera and species), misidentifications.
- ROMAN** : Family names.
- ROMAN : Names of suborders.
- Roman : FAO and local names.

A

ACANTHOCLINIDAE	5
Aobadai	11, 15
<i>Arripis</i>	5

B

<i>Brachyglaucosoma</i>	9
<i>Brachyglaucosoma taeniatus</i>	9
<i>Breviperca</i>	9
<i>Breviperca lineata</i>	9, 12
<i>buergeri</i> , <i>Glaucosoma</i>	9, 11, 15
<i>bürgeri</i> , <i>Glaucosoma</i>	9, 12, 15

C

CENTROPOMIDAE	5
<i>Cnidoglanis</i>	13

D

Deepsea jewfish	11
Dhufish	15

E

Epaulette fish	19
--------------------------	----

F

<i>fauxeli</i> , <i>Glaucosoma</i>	15
<i>fauxelii</i> , <i>Glaucosoma</i>	9, 11

G

<i>Glaucosoma</i>	5, 9, 16-17
<i>Glaucosoma buergeri</i>	9, 11, 15
<i>Glaucosoma bürgeri</i>	9, 12, 15
<i>Glaucosoma fauxeli</i>	15
<i>Glaucosoma fauxelii</i>	9, 11
<i>Glaucosoma hebraicum</i>	9, 11-12, 15
<i>Glaucosoma magnificum</i>	5, 16
<i>Glaucosoma scapulare</i>	11, 16, 18-19
<i>Glaucosoma</i> sp.	9
<i>Glaucosoma taeniatus</i>	9
GLAUCOSOMATIDAE	1-24
Grey bigmouth bream	10

H

<i>hebraicum</i> , <i>Glaucosoma</i>	9, 11-12, 15
--	--------------

J

Jewfish	15
Jewie	15

L

LABRIDAE	13
<i>lineata</i> , <i>Breviperca</i>	9, 12
LUTJANIDAE	5

M

<i>magnificum</i> , <i>Glaucosoma</i>	5, 16
<i>magnificus</i> , <i>Reganichthys</i>	9, 16
<i>Metapenaeopsis</i> sp.	17
MURAENIDAE	13

N

Nannygai	19
North-west jewfish	11
North-west pearl perch	11

P

Pearl perch	18-19
Pearl perches	4
PEMPHERIDIDAE	5
<i>Pempheris</i>	5
PERCOIDEI	5
PSEUDOCROMIDAE	5

R

<i>Reganichthys</i>	9
<i>Reganichthys magnificus</i>	9, 16

S

<i>scapulare</i> , <i>Glaucosoma</i>	11, 16, 18-19
--	---------------

T

<i>taeniatus</i> , <i>Brachyglaucosoma</i>	9
<i>taeniatus</i> , <i>Glaucosoma</i>	9
TERAPONTIDAE	5
Threadfin pearl perch	16
Threadfin pearl-perch	17

W

Westralian jewfish	15
------------------------------	----

